

PATENT COOPERATION TREATY
PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
 (Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference P610825/WO/1	FOR FURTHER ACTION	See Form PCT/IPEA/416
International application No. PCT/DE2004/002430	International filing date (<i>day/month/year</i>) 03.11.2004	Priority date (<i>day/month/year</i>) 15.11.2003
International Patent Classification (IPC) or national classification and IPC F02K9/52, F02K9/44, F02K9/64		
Applicant EADS SPACE TRANSPORTATION GMBH		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 6 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
a. <input type="checkbox"/> (<i>sent to the applicant and to the International Bureau</i>) a total of _____ sheets, as follows: <input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions). <input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
b. <input type="checkbox"/> (<i>sent to the International Bureau only</i>) a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:
<input checked="" type="checkbox"/> Box No. I Basis of the report <input type="checkbox"/> Box No. II Priority <input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability <input type="checkbox"/> Box No. IV Lack of unity of invention <input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement <input type="checkbox"/> Box No. VI Certain documents cited <input type="checkbox"/> Box No. VII Certain defects in the international application <input checked="" type="checkbox"/> Box No. VIII Certain observations on the international application

Date of submission of the demand	Date of completion of this report
Name and mailing address of the IPEA/EP	Authorized officer
Facsimile No.	Telephone No.

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Box No. I Basis of the report

1. With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

This report is based on translations from the original language into the following language _____, which is the language of a translation furnished for the purposes of:

 - international search (Rule 12.3 and 23.1(b))
 - publication of the international application (Rule 12.4)
 - international preliminary examination (Rule 55.2 and/or 55.3)
2. With regard to the elements of the international application, this report is based on (*replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report*):

the international application as originally filed/furnished
 the description:
 pages 1-10 _____ as originally filed/furnished
 pages* _____ received by this Authority on _____
 pages* _____ received by this Authority on _____
 the claims:
 nos. 1-11 _____ as originally filed/furnished
 nos.* _____ as amended (together with any statement) under Article 19
 nos.* _____ received by this Authority on _____
 nos.* _____ received by this Authority on _____
 the drawings:
 sheets 1/4-4/4 _____ as originally filed/furnished
 sheets* _____ received by this Authority on _____
 sheets* _____ received by this Authority on _____
 a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.
3. The amendments have resulted in the cancellation of:

the description, pages _____
 the claims, nos. _____
 the drawings, sheets/figs _____
 the sequence listing (*specify*): _____
 any table(s) related to sequence listing (*specify*): _____
4. This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

the description, pages _____
 the claims, nos. _____
 the drawings, sheets/figs _____
 the sequence listing (*specify*): _____
 any table(s) related to sequence listing (*specify*): _____

* If item 4 applies, some or all of those sheets may be marked "superseded."

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Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims _____	YES
	Claims 1-11	NO
Inventive step (IS)	Claims _____	YES
	Claims 1-11	NO
Industrial applicability (IA)	Claims 1-11	YES
	Claims _____	NO

2. Citations and explanations (Rule 70.7)

1. This report makes reference to the following documents:

D1: US 2003/074886 A1
 D2: US 3 439 503 A
 D3: US 3 498 059 A
 D4: US 5 172 548 A
 D5: US 3 675 425 A
 D6: DE 101 30 355 A1
 D7: US 3 459 001 A

2. D1 discloses (the reference signs in parentheses refer to D1):
 an injection element (30), more particularly for a rocket engine, having an inner element (36) with a first outlet opening (40) and an outer element (34) arranged coaxially thereto having at least one second outlet opening (42) arranged coaxially to the first outlet opening for receiving and injecting fuel into a combustion chamber, the outer element (34) additionally having third outlet openings in the form of holes (44) for forming a cooling liquid film layer that are arranged coaxially

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to the first and second outlet openings.

Such an injection element is also known from D2 (figure 1), D3 (figure 2; inner element 22 with openings 36, outer element 43 with second openings 40 and third openings 64), D4 (figure 5) and D5 (figure 2). An injection element with all of the features defined in independent claim 1 is therefore already known from documents D1-D5, taken independently of each other. Consequently, the subject matter of claim 1 cannot be regarded as novel (PCT Article 33(2)).

3. D6 (figure 6) discloses (the reference signs in parentheses refer to D6):
an injection element, more particularly for a rocket engine, having an inner element (1) with a first outlet opening (12) and an outer element (18) arranged coaxially thereto having at least one second outlet opening (19) arranged coaxially to the first outlet opening for receiving and injecting fuel into a combustion chamber, the inner element (1) having third outlet openings in the form of holes (11) for the formation of a cooling liquid film layer that are arranged coaxially to the first and second outlet openings.
An injection element with all of the features defined in independent claim 6 is therefore known from D6. Consequently, the subject matter of claim 6 cannot be regarded as novel (PCT Article 33(2)).

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4. Claims 2-5 and 7-11 contain no features that, in combination with the features of any claim to which they refer, appear to meet the PCT requirements for novelty and inventive step. In D3 (figure 2, reference sign 47) and D7, the outer element with the third holes has a swirler chamber, the holes being provided in a tapered area. In D3, the holes 64 lead into an annular gap 62. In all of the cited documents, the holes are equally distributed across the periphery, and in some of the documents the liquid streams mix, whereas in others, a cooling film layer is oriented towards the combustion chamber inner wall.

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Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

1. The wording of claims 1 and 6 does not make it clear (PCT Article 6) whether only the outer element or also the inner element contains fuel.
2. Claim 6 lacks clarity (PCT Article 6) since, according to the description (page 9, second paragraph), the holes (16) in the inner element are for premixing rather than for forming a cooling liquid film layer.
3. Furthermore, said holes (16) solve different problems in claims 1 and 6, namely wall cooling in claim 1, and premixing of the fuel in claim 6, and therefore the application would not meet the requirement of unity of invention stipulated in PCT Rule 13.

In order to avoid this problem, it is recommended that independent claim 6 be deleted.

4. Contrary to the requirements of PCT Rule 5.1(a)(ii), the description neither cites documents D1-D5 and D7 nor indicates the relevant prior art disclosed therein.